

Claims

1. A method for the detection of small quantities of particles by the detection of antigen-antibody precipitates which comprises:

5 providing a sample fluid that essentially contains particles with a given maximum particle size, the particles having at least two antibody binding sites;

providing a fluid containing antibodies that essentially contains particles having a given maximum particle size;

10 contacting the sample fluid with the fluid containing the antibodies, which yields a reaction fluid where in the presence of particles having at least two antibody binding sites the antibodies can form an antigen-antibody precipitate;

directing a light beam through the reaction fluid;

detecting a signal by measuring with a photodetector the extinction at the light-dark boundary of the cone of light that is produced when the light generated by the laser is passing through

15 the measuring cell containing the reaction fluid, the signal strength depending on the size and number of antigen-antibody precipitates formed.

2. A method according to claim 1, wherein the sample fluid contains particles in the order of magnitude of femtograms or attograms per liter.

3. A method according to any of the preceding claims, wherein the step of providing a sample fluid that essentially contains particles having a given maximum particle size comprises:

a) providing a fluid,

introducing a sample into the fluid, and

25 separating particles that exceed a given particle size, in order to obtain a sample fluid that essentially contains only particles having a given maximum particle size, or

b) providing a fluid that essentially contains particles having a given maximum particle size and

30 introducing a sample into the fluid that essentially contains particles having a given maximum particle size, in order to obtain a sample fluid that essentially contains particles having a given maximum particle size.

4. A method according to any of the preceding claims, wherein the separation of the particles having a size exceeding the given maximum particle size is effected by filtration, the filter having a pore size of preferably 20 – 450 nm, more preferably of 100 – 300 nm, and particularly of 200 nm.
5. A method according to any of the preceding claims, wherein at least two monoclonal antibodies or one polyclonal antibody are employed as antibodies.
6. A method according to any of the preceding claims, wherein the antibody is selected from the group consisting of immunoglobulin G or immunoglobulin M.
7. A method according to any of the preceding claims, wherein the method allows the quantity of particles to be detected quantitatively or semiquantitatively.
8. A method according to any of the preceding claims, wherein, at a constant concentration of antibodies, the decrease of the measured signal is directly related to the concentration of antigens.
9. A computer program product comprising program code means stored in a computer readable medium, for carrying out the method according to any of the claims 1 to 8 when the computer program product is executed on a computer, a network device or a device, particularly an analytical detection device.
10. A computer program product comprising a program code downloadable from a server, for carrying out the method according to any of claims 1 to 8 when the computer program product is executed on a computer, a network device or a device, particularly an analytical detection device.
11. A device for the detection of small quantities of particles which comprises:
 - a laser,
 - a measuring cell, and
 - a photodetector that is designed for carrying out a measurement of extinction at the light-dark

boundary of the cone of light that is produced when the light generated by the laser is passing through the measuring cell containing the particles in a fluid, wherein the photodetector has an adjustable signal amplification and an adjustable operating point.

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12. A kit for qualitative and/or quantitative detection of a given particle to be detected, wherein the given particle has at least two antibody binding sites, the kit comprising:

at least one antibody that is capable of specifically binding to the given particle, and

at least one suitable fluid for receiving the sample, and

10 a device for the detection of small quantities of particles comprising:

a laser,

a measuring cell, and

a photodetector designed for carrying out a measurement of extinction at the light-dark boundary of the cone of light that is produced when the light generated by the laser is passing

15 through the measuring cell containing the particles in a fluid.